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JULY 1986

food engineering

In this issue: **ENGINEERED FOODS**

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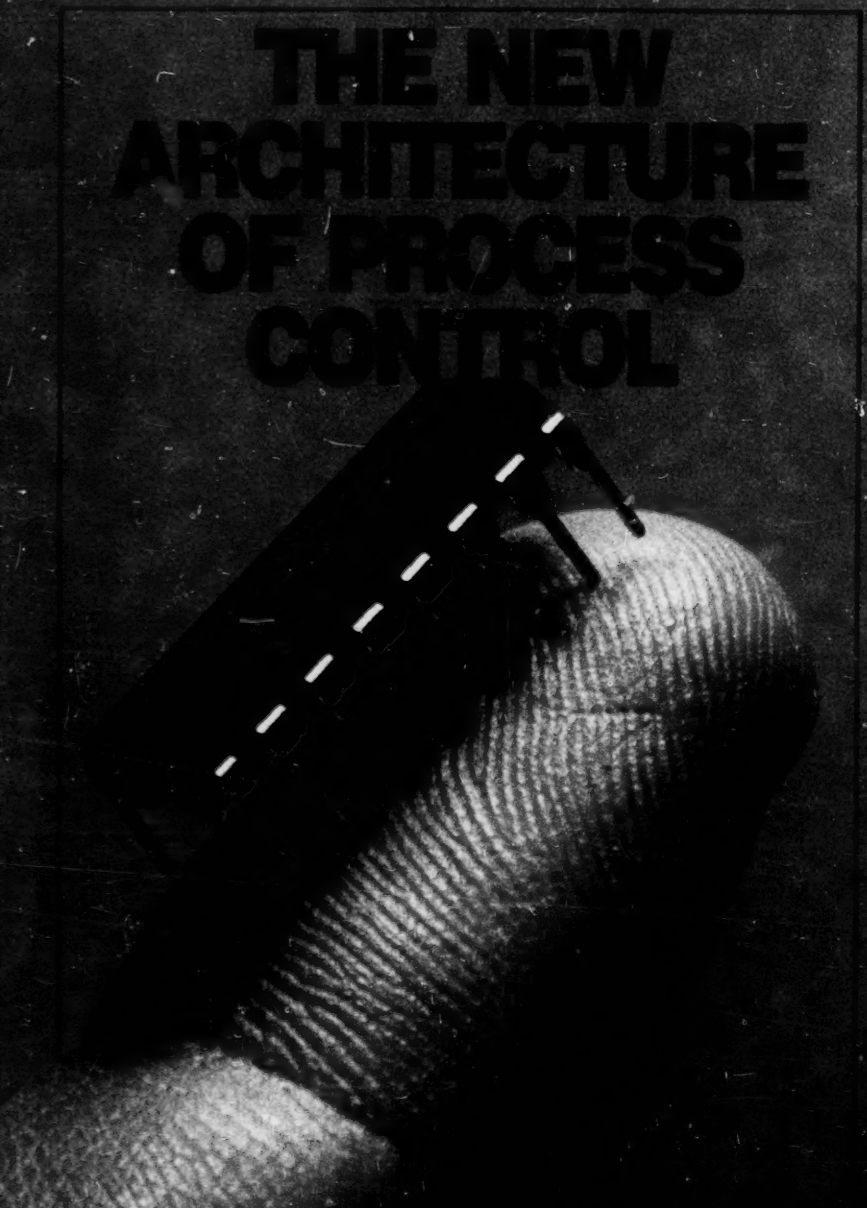
THE NEW ARCHITECTURE OF PROCESS CONTROL



IN THE LOOP

The new generation of digital process control, with more distributed control possibilities, allows the processor and the process to be "smarter".

THE LONG HAUL

The key for the fleet manager is low cost of ownership; the right mix of ownership, leasing, and contract hauling; and knowing when to go by road and when by rail.

Chilton's Food Engineering

COVER STORY

Process control systems are redefining how the food industry handles its manufacturing operations. Computer-controlled systems can now be linked together to achieve a coordinated, more efficient operation.

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With the U.S. tax system being overhauled for the first time in 50 years, experts predict it will mean substantially higher after-tax profits for food companies big and small.

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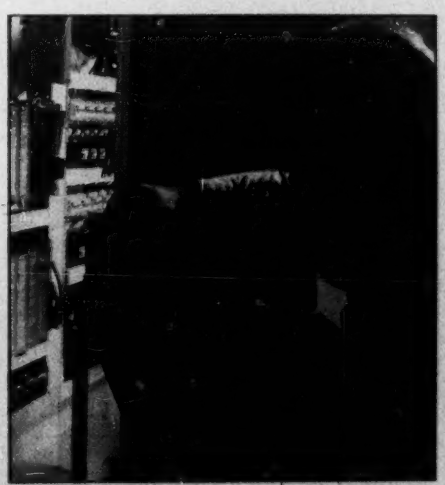
76 Trucks & Transportation
Food Engineering takes an in-depth look at how the food industry is handling its transportation needs. An exclusive survey with 3,000 distribution managers, an editorial roundtable discussion, and interviews with a cross-section of distribution managers within the industry evidence the ever-increasing importance of the distribution function.



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The fortification of soft drinks with fruit juice is becoming more prevalent. Why? To satisfy consumer perceptions of better nutrition and to provide a source of vitamin C.

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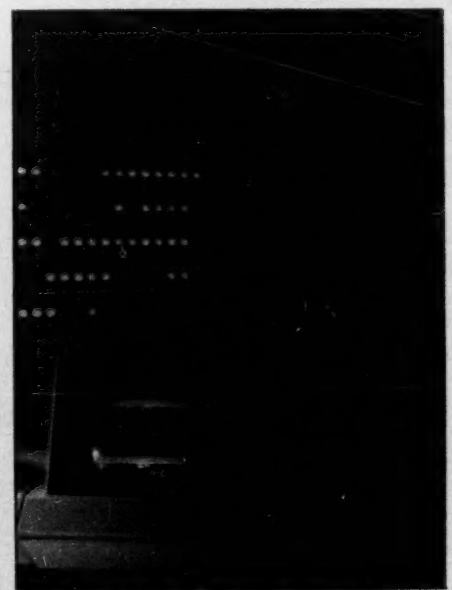

NEW HFCS PLANT: PAGE 94

Special Emphasis

TRUCKS & TRANSPORTATION: Distribution managers are now, more than ever before, affecting their companies' bottom lines by being innovative in choosing the proper mix of transportation for their products.

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role in the development of food products packaged in plastics.

"Recent developments in plastics performance open the door for very exciting changes in the food industry," said Wilmer A. Jenkins, director of the Packaging Products Division of Du Pont's Polymer Products Department. "Convenience, appearance, taste, nutrition, shelf life, cost and a host of other processed food qualities will be dramatically improved in coming years through the use of plastic packaging."

The awards competition will be conducted in cooperation with the National Food Processors Association, a non-profit scientifically based industry organization representing more than 600 food processors and suppliers to the industry. Winners will be announced at the NFPA convention, January 24 to 28, 1987.

Judging for the prizes will be conducted by a panel of experts drawn from the food processing and packaging industries, as well as industry suppliers, educators and members of the trade press. The deadline for entries is November 30, 1986.

Criteria for evaluating entries will include: improvements in flavor, taste, aroma and appearance of the food product; making the product easier to use, safer, more nutritious, available to greater numbers of people, less expensive to make, buy or use; extending shelf life; reducing spoilage or waste; and improvements in product retailing.

For further information or to obtain an entry form, call (302) 999-2525.

Study shows aseptic packaging will continue to grow

Summary Table

Aseptic Food/Beverage Products

(millions of units)

	1985	1990	1995	1995 % of Total	% AAGR 85-95
Dairy	310	505	1,525	.75%	17.2%
Wine/Water	200	1,500	2,740	4.2%	30.0%
Fruit Juices/Drinks	3,610	4,950	6,640	17.3%	6.2%
Tomato Prod.	—	67	113	5.5%	11.0%
Particulate Foods	340	820	1,230	25.6%	3.7%
Total	4,460	7,842	12,248	3.9%	10.6%

Source: Business Communications Co., Inc.

The chart give projections for aseptic packaging by category. Also given is a projected 1995 percent of total by category and average annual growth rates.

According to a recently published study by the Plastics Research Division of Business Communications Company, Inc., the total market for aseptic packaged foods and beverages will grow at a compound average annual rate of 10.6% between now and 1995. The analysis notes that aseptic food/beverage packaging is still small compared with all other packaging techniques, accounting for only 4.5 billion units out of a total market of 313 billion units in 1985.

Over 12 billion by '95

However, BCC projects that by 1995, packaging for 12.2 billion units of food/beverage, or 4 percent of the total, will be of the aseptic type. Aseptic packaging for wine/water, dairy and particulate-type foods and beverages will experience even faster average annual rates of growth.

Juices, the major product found in aseptic packages to-date, will be joined by a wide range of low-acid and particulate food products. Fillers capable of handling particulates the size of chili beans or vegetables in stew have created the need for new types of packaging.

Paperboard innovations

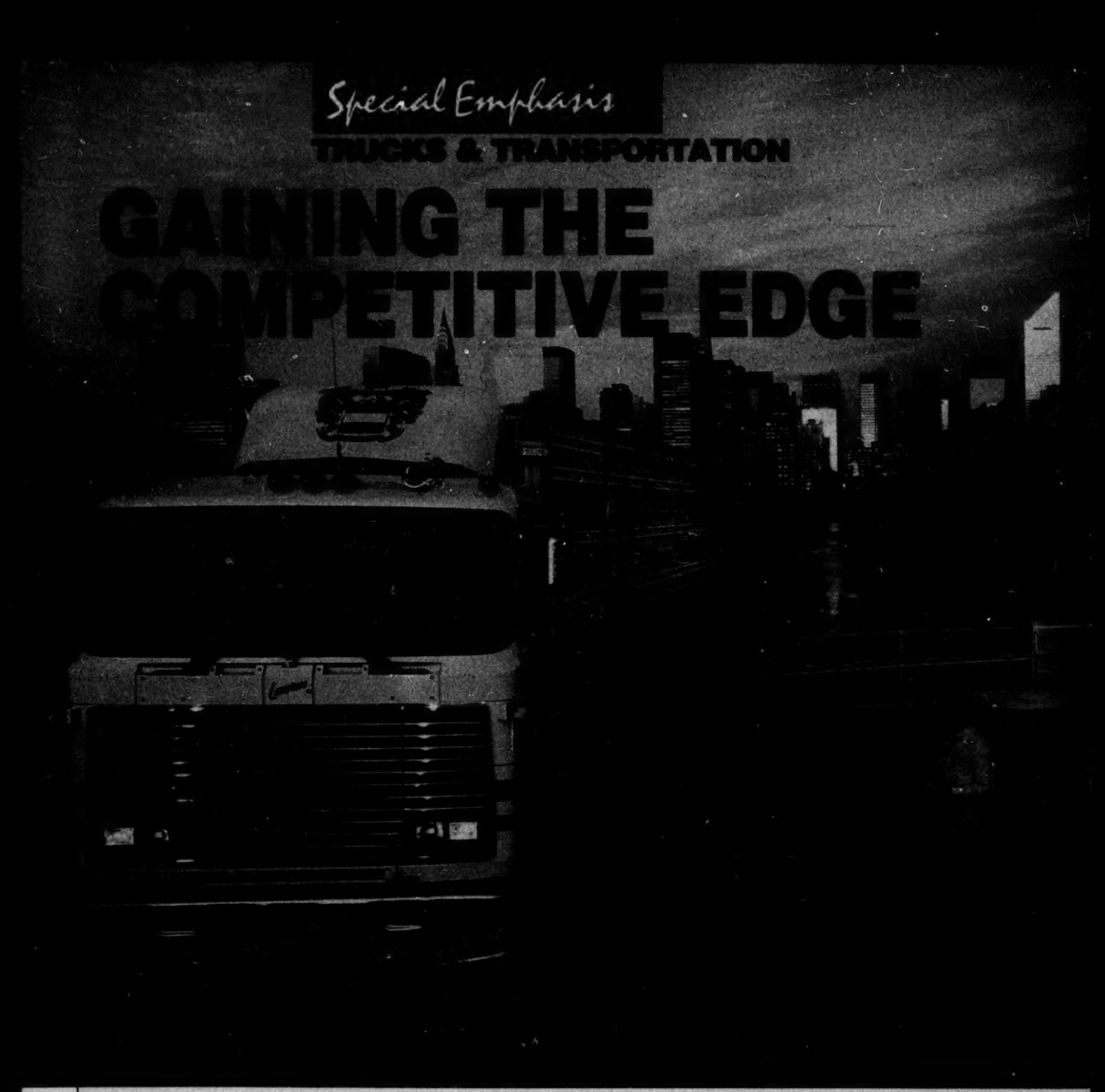
Paperboard packages, according to the report, will continue to represent the most common type of aseptic packaging, as improved barrier materials and closures and new package sizes are introduced. Telescoping straws, peel-off tabs, reclosable packages and more adult-sized containers will allow for additional market expansion of the paperboard package.

Thermoformed containers will experience the most significant growth as new materials and thermoforming technology allow for a wider variety of container shapes and sizes as well as barrier properties. Viscous and particulate products are the most attractive new products to be packaged in thermoformed containers. Baby food in resealable containers is already on the market, and other low-acid particulate products can be expected in the near future, according to Business Communications Co. Soups should also be a major growth product.

Particulate processing

The introduction of aseptic processing equipment and fillers that can preserve particle integrity will open up a vast segment of of food products to aseptic packaging, says the study. This technology will provide the first real challenge to metal and glass packages.

The study notes that the distribution of aseptically packaged products, particularly single-serve beverages, is changing from the traditional methods. Soft drink bottlers are getting into the act as distributors and/or packagers of aseptic beverages. Vending machines specifically designed for the brick-shaped packages are becoming more common in schools and public facilities.



Special Emphasis

TRUCKS & TRANSPORTATION

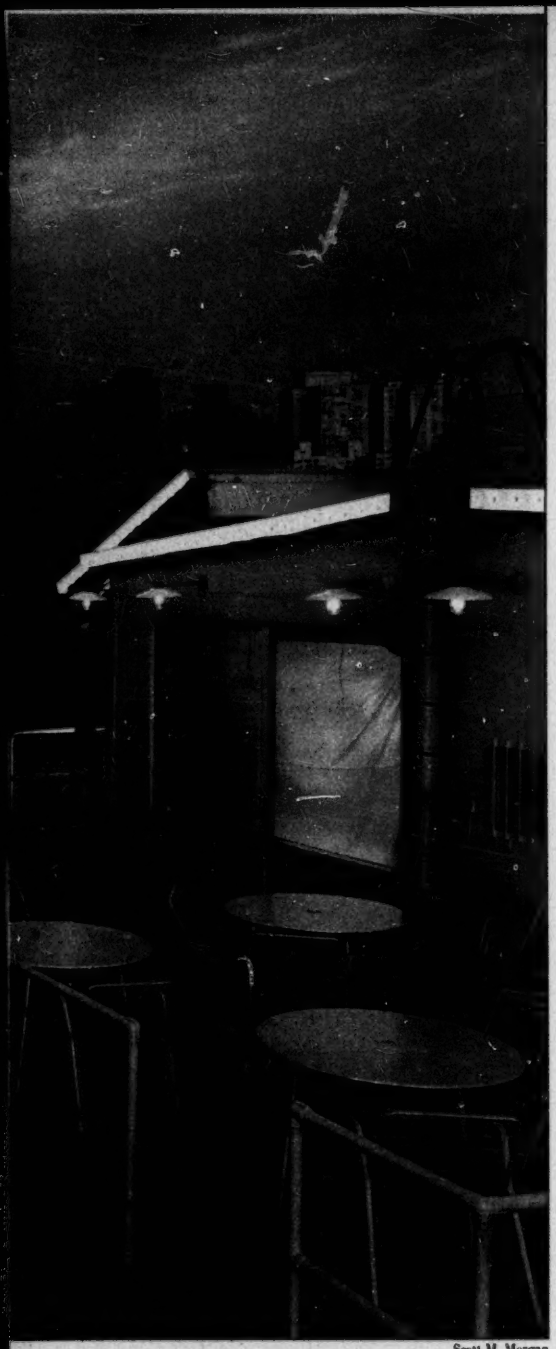
GAINING THE COMPETITIVE EDGE

We polled over 3000 distribution managers, interviewed a cross-section of them and took part in a roundtable to discuss transportation in the food industry. We found there are more ways ways than ever to handle your transportation needs. And in a deregulated climate, your options are only limited by your imagination—and your pocketbook.

Transporation managers, distribution managers and logistics vice presidents are rapidly becoming the lynch pins of the food industry. With manufacturing adopting Just-In-Time techniques, transportation now plays a more vibrant, vital role in the success of any company.

In an industry where it is estimated that distribution represents about 25% of total manufacturing cost, it is evident just how important the distribution operation is. Call it "gaining the competitive edge" or "affecting the bottom line", the effect that

LINDA K. FREEMAN
Managing Editor



Scott M. Morgan

the distribution area of any company has is more important in 1986 than ever before.

Food Engineering took a survey of more than 3,000 distribution managers within the food industry to see how they are handling their transportation needs. More than 10% responded.

Interviews were conducted with a cross-section of distribution managers to see how companies are moving their products on a company-by-company basis. And *FE* led an editorial roundtable (with Ryder Truck Rental, Inc.) to discuss transportation within the food industry *(see sidebar)*.

What we've determined is that there are as many ways to handle transportation as there are companies doing it.

Still, the results of our survey showed that most food companies are using trucks as their primary form of hauling product. The American Trucking Association tells us that trucks haul 80% of all food products—95% of all bakery products, 90% of dairy products, 75% of canned fruits/vegetables, 50% of grain and mill products and 60% of all beer.

On an individual basis, our survey showed that companies are using a combination of leasing, owning their own fleets, and contracting out the hauling to get the job done. Very few transportation managers are using only one way to move goods, unless it's contracting out.

Effects of deregulation

Out of 339 respondents to the FE survey, 23.3% use contract hauling 100% of the time to get the job done. Ten years ago you probably would not have gotten that response. What made the difference? The Motor Carrier Act of 1980 deregulating the trucking industry, creating within that industry a competitive climate that had never existed before.

For truckers deregulation proved to be a boon to some and the death knell of others. But it was almost universally a plus to the shipper.

The carriers that have not survived under deregulation failed for a number of reasons. But those carriers who could innovate and provide services needed by the shipper are the survivors.

David Thompson, vice president, Distribution & Logistics at Campbell Soup Company puts it clearly: "The emphasis today is more on the quality of the service than the costs. In today's environment, most of the carriers are selling quality and service—on-time pickup and delivery guaranteed."

When polled on our survey, 89.4% of the respondents felt that deregulation of the transportation industry has had a positive effect. The increase in competition among the truckers and more reasonable rates were the two biggest pluses, according to the distribution managers. But a close third was that truckers are taking an active interest in the food industry. The more they learn about it, the better services they can supply. Thus, the shippers reap the benefits of an enlightened carrier.

Contract hauling

Contract hauling has proved to be the choice of three-quarters of the respondents

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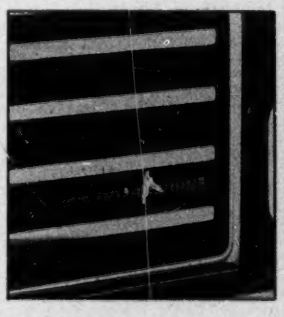
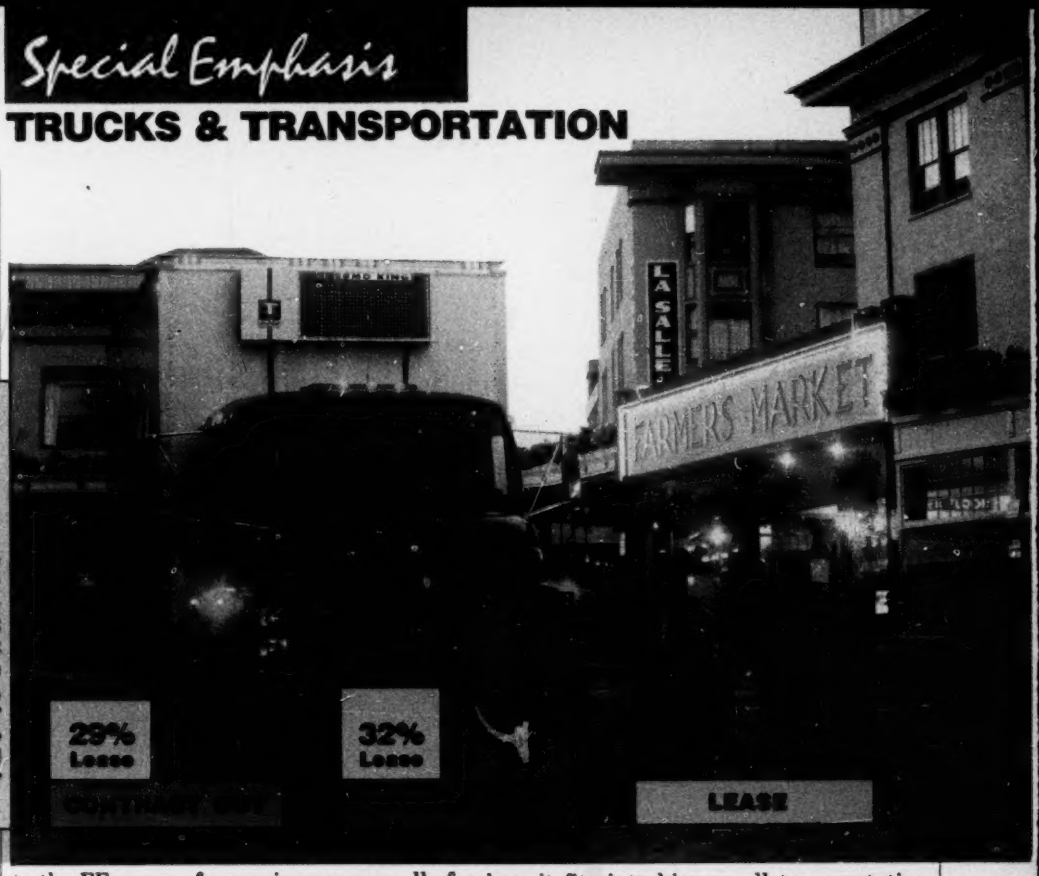


"We approach our market by providing equipment and service that will offer lower cost of ownership over the life of the truck" . . . John McDonald, Navistar International.

TRUCKS & TRANSPORTATION



Question #1 of the Food Engineering survey asked:
"How do you handle your trucking needs?"
Virtually all of the respondents use a combination of contract hauling, leasing and fleet ownership. The chart shows the breakdown of each category, i.e., of the total number who contract out, 29% of them also lease and 39% also own their own fleet.

to the FE survey for moving some or all of their product. Almost universally their reasons were that it was less expensive than owning their own fleet or leasing. "With someone handling your trucking needs for you there is low capital investment, low cost, low overhead," said one respondent.

With deregulation shippers are now better able to negotiate the best price. And with a large pool of carriers to pick from, flexibility is possible.

Our respondents tell us that this meshes particularly well with a company-owned fleet. During peak periods when the fleet cannot haul all that needs to be moved, a short-term contract fills the need.

A primary advantage to contract hauling, say our respondents, is that they do not have to worry about whether or not backhauling can be arranged – the carrier takes care of that. Backhauling can also save money for a company-owned fleet, but the logistics of scheduling and on-time delivery while backhauling can be difficult and sometimes impossible to make cost-effective in a fleet operation. Backhauling, of course, benefits the trucker, too, as his truck is filled on both ends of the trip.

Richard L. Dwyer, area manager of traffic and distribution for Continental Can, is a veteran of 20 years with the company. Continental formed its own transportation subsidiary, Allpoints Distribution Services, Inc. But Dwyer decides when he will use Allpoints and when he won't, depending on how it fits into his overall transportation plan. For example, the Allpoints operation is used for a Chicago to New Jersey run because they can backhaul from New Jersey. But Dwyer would use a common carrier for a shipment to Washington state to make better use of backhaul opportunities.

Specialized hauling

In a field where competition is fierce and the needs specific, someone who provides specialized services can carve out a niche for themselves. There is a variety of companies who provide specialized services to fit the individual needs of specific companies.

One, Matlack, Inc., is representative of the individualized service available to fill virtually any transportation need. Matlack, who does a lot of contract hauling and also operates on a lease basis, is a bulk commodities shipper, hauling high fructose corn syrup, vegetable oils of varying types, dry sugar and flour in pneumatic trailers, sugar syrup, juices, concentrates, wines and whiskey, among others. They are also providers of intermodal services, unloading from rail to truck for delivery.

Martin C. Hynes, Jr., vice president of marketing, describes their intermodal service like this: At a shipper's location, a product such as HFCS will be loaded onto a rail car and shipped by rail. The HFCS is then stored in the rail car until a Matlack truck arrives and unloads certain amounts for delivery to the company's customers, in

priorities set by the shipper. This relieves the shipper of having to offload into specialized trucks and it means the receiver, who almost never has rail on-site, can get timely delivery of product.

Having your own fleet

A sizeable percentage, 46.3%, of our respondents said they maintain their own fleets. Some of the fleets are small and cover just a small percentage of total shipments for the company. Other companies use only their fleets to deliver their products.

"Cost and control" were cited as the two main reasons for owning a fleet. Many felt that you have more direct control of the total operation, including scheduling of maintenance, spacing of trucks, protection of product quality and the ability to respond rapidly to company needs.

But on the downside of owning a fleet, our respondents cited loss of backhauls, high capital investment (both initial expense and replacement costs), the need and expense to maintain a service facility, the expense of having your own drivers, the difficulty of handling peak times, unused equipment during slow times and the high cost of insurance.

The leasing alternative

Leasing appears to be the land of opportunity for those supplying transportation to the food industry. A whopping 51.6% of the survey respondents said they do not now lease. Of those who do lease, only 3.8% use leasing for 100% of their needs. The largest percentage of those leasing, 6.5% use leasing for less than 10% of their total transportation requirements. This makes the food industry an area of great potential growth for leasing.

There are some very definite advantages to leasing, say our respondents, including the availability of replacement vehicles as needed, no initial or replacement vehicle costs, no need to maintain a service facility or its personnel, the ability to adjust to seasonal needs, availability of service, and lower insurance costs.

But there are downsides, too, say the respondents, the main detriment being the cost of leasing equipment. Leasing industry sources, however, cite the annual A.T. Kearney "Private Fleet Survey", done for the Private Truck Council, that indicates that "leasing is a somewhat lower cost alternative to truck ownership."

If you ask a leasing company, however, what the impediments are in securing a larger chunk of the transportation requirements of the food industry, they'll tell you it's one of education. "There are a lot of people who don't truly understand leasing and

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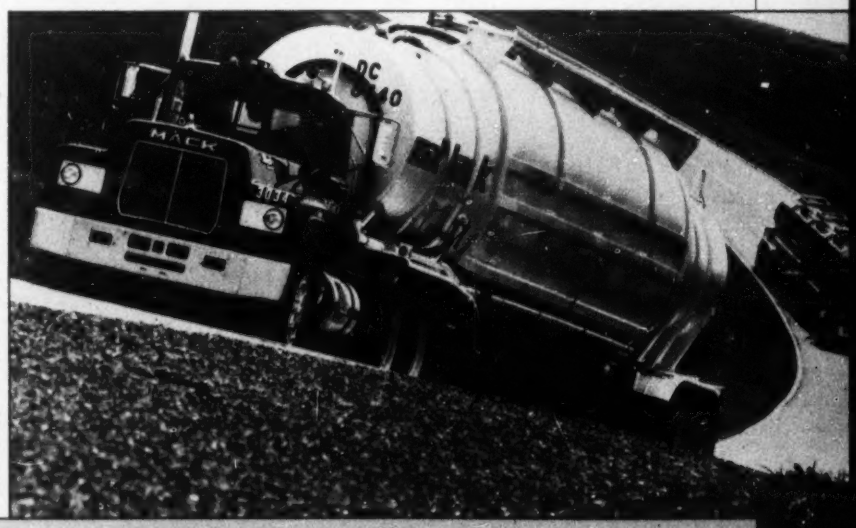
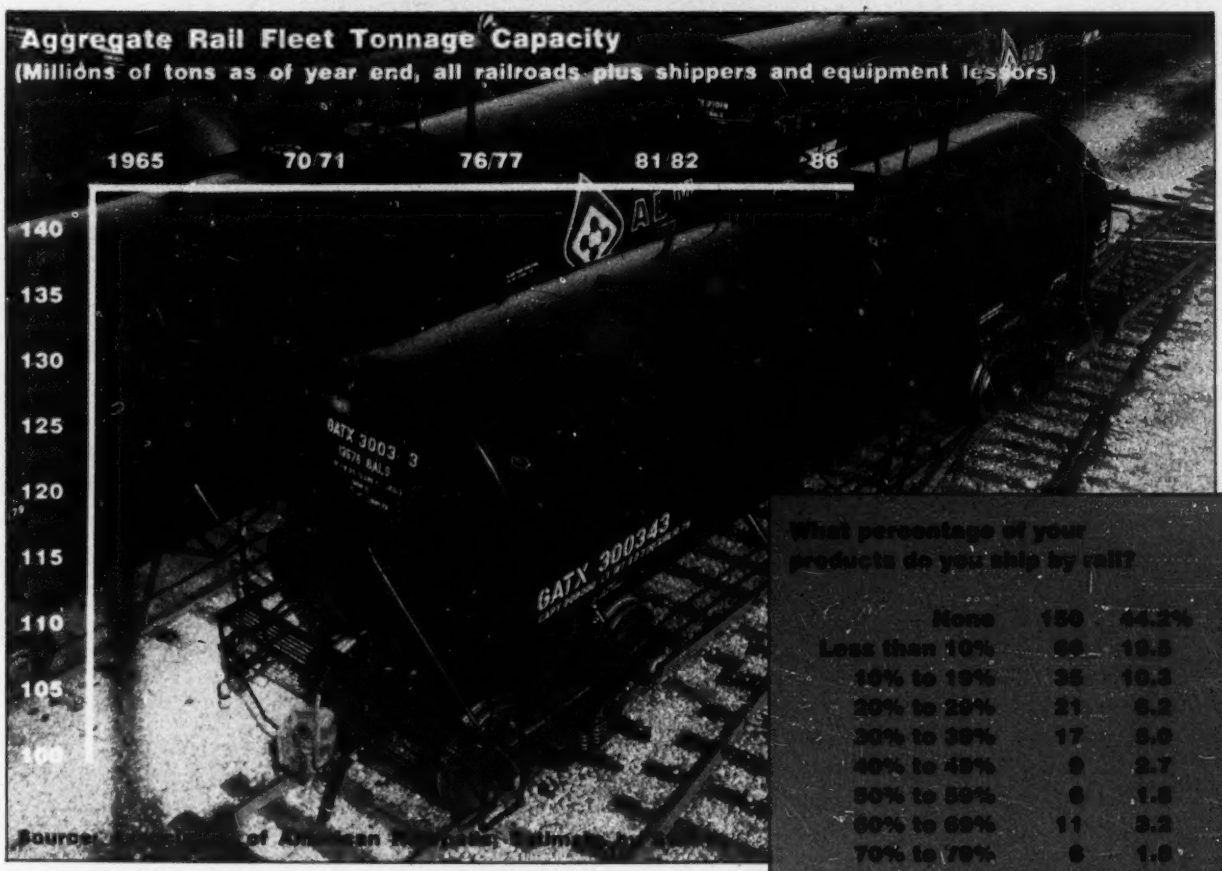


How much do you ship by...	COMMON CARRIER		OWN FLEET		LEASED	
None	64	18.9%	145	42.8%	175	51.6%
Less than 10%	9	2.7	24	7.1	22	6.5
10% to 19%	14	4.1	16	4.7	12	3.5
20% to 29%	8	2.4	10	2.9	10	2.9
30% to 39%	8	2.4	8	2.4	10	2.9
40% to 49%	6	1.8	4	1.2	3	0.9
50% to 59%	7	2.1	9	2.7	7	2.1
60% to 69%	8	2.4	9	2.7	3	0.9
70% to 79%	10	2.9	6	1.8	6	1.8
80% to 89%	16	4.7	7	2.1	1	0.3
90% to 99%	44	13.0	9	2.7	7	2.1
100%	79	23.3	23	6.8	13	3.8
No Answer	66	19.5	69	20.4	70	20.8
Total Respondents	339	100.0%	339	100.0%	339	100.0%



Food industry use of rail has, for the most part, declined over the years. To counteract this, railroads are trying to be more innovative in responding to specific customer needs and are working to improve on-time performance.

don't understand the benefits of leasing," says Douglas M. Slack, vice president of sales, Ryder Truck Rental, Inc. Ryder uses a computer program to assess a prospect's transportation needs and provide a detailed analysis of whether or not leasing is the best alternative for that company.

There are many different kinds of services available from a leasing company, depending on the specific needs of the customer—including a *Full Service* or *Operating Lease*, *Finance Lease*, contract maintenance, or truck rental. This is one area where leasing companies feel they can best serve the food industry, by tailoring services to fit individual companies. You don't get more service than you want, you don't get less. You get exactly what you need.

Both Slack of Ryder and Hynes of Matlack agree on one thing—it's service that counts. As Hynes says, "Service is more important than rates. It is really more than service; it is quality management in making the movement." Common to both Ryder and Matlack is the idea that leasing is the best choice for a food company distribution manager because it relieves him of the problems of trying to be a transportation company, too.

What percentage of your products do you ship by rail?

None	150	44.2%
Less than 10%	63	18.6
10% to 19%	35	10.3
20% to 29%	21	6.2
30% to 39%	17	5.0
40% to 49%	9	2.7
50% to 59%	6	1.8
60% to 69%	11	3.2
70% to 79%	6	1.8
80% to 89%	3	0.9
90 to 99%	3	0.9
100%	1	0.3
No Answer	11	3.2
Total Respondents	339	100.0%

What about rail?

A dramatic response to FE's survey had to do with the lack of utilization of rail to ship products. Although 55.5% of the respondents use rail, close to 30% of that number use it for less than 19% of their shipping needs. The bulk of the respondents who use rail use it for less than 40% of their needs. Why is this?

Because trains can't meet manufacturing/distribution schedules, says Thompson of Campbell Soup, and many others. Another problem is the length of time the product is in transit, which costs the company money for each day it is being shipped.

But a major complaint of survey respondents and those at the roundtable was the railroads' inability or lack of interest in be-

(Continued on page 84)

ing innovative to fit individual shipper needs.

A roundtable participant commented that "most of the railroads are not very innovative. They'll come to you and give you a program they're marketing. And when you start to tell them what you need, they'll say that's not part of the program."

But deregulation (the Staggers Act) has hit the railroad industry too, heightening the need for innovation, just as in the trucking industry.

Says Joseph Hayes, vice president, marketing, of GATX, "The ability of railroads to establish contract rates, and to be more flexible and sensitive to the needs of shippers, has made the railroads much more cost sensitive, as well as forced them to put greater emphasis on productivity."

And equipment is changing, too. There is the Airslide car, designed to move finely divided dry material like flour, sugar and starch. Thirty years ago when first designed, the Airslide was a 2600 cu. ft. car. Today it is 4900 cu. ft., to provide improved productivity.

Improvements have been made to tank cars, used for large volumes of corn syrup, soybean oil, vegetable oils, tallow, molasses, wine, lard, and liquid sugar. One such improvement is the *BTUniform Coil System* which provides a uniform distribution of heat to protect certain commodities without damaging the lading.

And there is the TankTrain System, a string of interconnected tank cars used to carry a wide variety of commodities.

Other innovations include "double stack" train service. Here light, strong container units are stacked two-high atop a railcar, 200 units to a train. It is estimated that 50% of the cost of conventional freight loading is saved by the use of double stacks.

The CSX Corporation, formed through a merger of the Chessie System and Seaboard Coast Line, created *The Orange Blossom Special*, a train that makes a daily run from Orlando, FL to Wilmington, DE to provide overnight delivery of fresh Florida fruits and vegetables to the northeast. The train is made up of truck trailers loaded with produce sitting on rail flatcars. CSX also owns a trucking unit and a barge line to be able to increase their opportunities to provide intermodal service.

There are certain areas of the food industry where it makes more sense to ship by rail than by other means. But that is not enough to satisfy the railroaders. They'll keep working, they say, to improve on-time delivery and to provide the type of innovative services necessary for them to grow as a supplier to the food industry.

Low cost of ownership

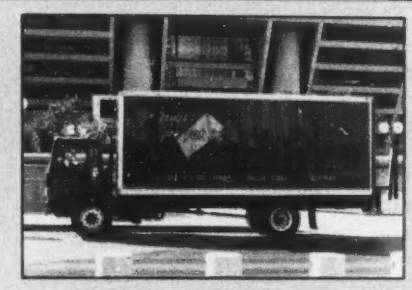
Whether you're a fleet operator or leasing trucks where you are responsible for maintenance, "low cost of ownership," or LCO, is a vital part of how you accomplish your job. And when you talk to truck manufacturers, LCO is high on their lists for supplying quality equipment.

At Navistar, makers of International trucks, John McDonald, manager of product publicity and company advertising, says that Navistar approaches its market by providing equipment and service that will offer lower cost over the life of the truck. Taken into consideration in determining LCO is initial purchase price, trade-in value, positive tax aspects and support services. And to a company like Navistar that holds, according to McDonald, 26% of the medium to heavy truck market and 33-34% of the cabover market, operating within the parameters of LCO is the difference between heading the pack and running in it.

Derek Kaufman, vice president, marketing, of Freightliner, says that the secret to

(Continued on page 86)

Innovations in Food Industry Transportation & Distribution



Editorial Roundtable

Participants:

David L. Anderson
Vice President, Logistics
Temple, Barker & Sloane, Inc.

H. Steven George
President
Tennessee Cartage Co., Inc.

Stephen D. Gould
Director of Distribution
Pepperidge Farm, Inc.

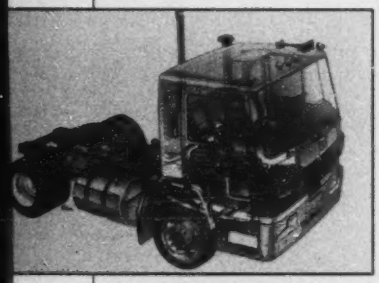
Fred Keith
President
Atlanta Bonded Warehouse Company

Dennis M. Klinger
Vice President, Management Information Systems
Ryder Truck Rental, Inc.

John C. Langley, Ph.D.
Prof. of Marketing/Logistics
University of Tennessee

Douglas M. Slack
Vice President, Sales
Ryder Truck Rental, Inc.

David H. Thompson
Vice President, Distribution & Logistics
Campbell Soup Company



Volvo White's new line of distribution trucks and tractors will, according to the manufacturer, "provide immediate payback from the minute they hit the road."

LCO is the "total package of how the truck is designed for the job at hand...and also the way it is run." He echoes McDonald's statement that support of the vehicle and the total support system play a vital role.

Kaufman says that one of the best ways to affect LCO is "by careful specing of the truck prior to purchase so you don't have less or more truck than you need." To help their customers, Freightliner offers *SPEC PRO*, which is a computerized Freightliner data book. With this system, a purchaser can sit down and say "...what if" to cover any contingency, and the computer will do a complete analysis.

When Freightliner became a subsidiary of Daimler-Benz AG and started marketing Mercedes-Benz medium-duty (Class 6 & 7) trucks, it greatly expanded its marketing capabilities. With the competition in the Class 8 (heavy duty) field growing ever more intense, the added capability of serving the Class 6 & 7 markets is a real plus. It allows Freightliner to appeal to a broader customer field.

At Mack Truck, long a well-known name in truck tractors, service is the key to success and LCO. To achieve this, a totally electronic command center has been built for Mack Parts Operations to manage the company's worldwide parts operations. In place is *Tandem Non-Stop*, a computer based communications network for instantaneous contact between Mack parts operations and its computer systems. This is expected to better Mack's 94% first-time fill rate for all customer orders. This is just one way Mack sees itself affecting LCO. With instantaneous response, downtime becomes "a distant memory," says Mack.

Volvo White Truck Corporation has introduced the *FE Series* designed to offer LCO by overcoming urban congestion, gridlock and other abuses associated with city traffic, as well as taking into consideration regional transportation where fuel economy and the ability to maintain road speed on highways is important.

The bottom line

At the roundtable, one of the speakers summed up his estimation of what a distribution manager is looking for: It's 100% quality. "If you expect 100% quality," he said, "that's what you get. If you expect 97%, that's what you're going to get." And with those expectations, distribution is being handled more efficiently and more effectively. That way, everyone comes out a winner. Especially the bottom line.

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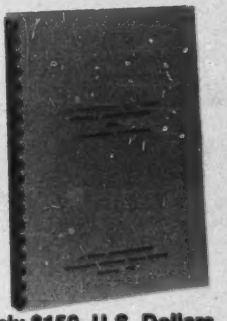

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